

# Biology: Railway Damn Data Report

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# 1.0 - Introduction

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**1.1** - Adaption is an evolutionary process in which a group of species becomes better suited to its habitat. This process takes place over many generations, and is also one of the most widely known phenomena of the way our Biological world works (Wikipedia, 2011). An ecosystem is an environment in which various organisms may inhabit, and therefore use the resources available within that ecosystem to survive. Abiotic and biotic (non-living and living) factors are both responsible for the way a particular ecosystem functions and what organisms are present within that ecosystem. This experiment is focused on exploring and identifying what abiotic and biotic factors lie within a particular ecosystem, and how these effect the way that ecosystem functions.

**1.2** - The chosen Ecosystem, Railway Dam, is a huge part of Roma, QLD and is known by every local as one of the most natural and conserved places within the entire district. The dam was originally constructed in 1874 due to the shortage of surface water available within the town. However, the dam had too small of a catchment area and was rendered useless (TownsinAustralia, 08). The dam is still used today for residents and visitors when doing long walks, jogs, luncheons, and other community events. The dam has been well maintained from human damage over the years by the local council and residents which has overall kept the dam's flora and fauna healthy and flourishing.

**1.3** - The procedure of the experiment begins with recording of flora and fauna of the area, and then followed by the measuring of temperature, pH, litter, and then finally, the abiotic factors of Railway Dam are recorded. This is done for both the aquatic and terrestrial parts of the dam. The focus of this investigation is to gather data related to the chosen local ecosystem (Railway Dam) by using various methods and testing, discussing the results from the experiment, and possibly comparing results to other records.

## 2.0 - Materials

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| <u>Item</u>               | <u>Quantity</u> |
|---------------------------|-----------------|
| Thermometer (Soil, Water) | X1              |
| Thermometer (Air)         | X1              |
| pH Test Tape              | X1              |
| Paint Palette             | X1              |
| Pen                       | X1              |
| Book                      | X1              |
| Quadrat (1m)              | X4              |
| Pipe Connector            | X4              |

## 3.0 - Method

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**Note: Complete each step for both aquatic (water) AND terrestrial (soil/land) areas.**

### **3.1** - Flora and Fauna

1. Traverse the chosen ecosystem on foot.
2. Whilst doing this, record all identifiable flora and fauna you see, and estimate the amount that would be present in that ecosystem.
3. Once finished recording and traversing draw a sketch of each flora and fauna.

### **3.2** - Temperature

1. Attach the 4 pieces of pipe together with the pipe connectors to form a 1m<sup>2</sup> square.

2. Find a random piece of terrestrial/aquatic land, turn your back to it, and gently drop the square behind you.
3. Place the thermometer (soil, water) in one corner of the square. Gently push it so the bottom ¼ of the thermometer is in the ground/water. Repeat this on two other corners. Record all data.
4. Place the thermometer (air) in a random patch of air within the square. Repeat this on two other random patches of air. Record all data.

### 3.3 - pH

**Note: This test is done in the same space as test 3.2 - *Temperature*. Do not use a new piece of land.**

1. Rip a small (3-5cm) piece of tape from the pH test tape.
2. Either -

**Terrestrial:** Dig up a small amount of soil with your finger, lightly drench it in water (from nearby), and place the resulted mud inside the paint palette. Mix a part of the piece of pH tape in with the mud.

**Aquatic:** Dip the piece of pH tape partially into some water.

3. Remove the pH tape from the water/mud, and place it on the paint palette to dry. Record the result.
4. Repeat the steps on two other pieces of soil/areas of water (still working within the same square area)

### 3.4 - Litter

1. Traverse the chosen ecosystem on foot.
2. Whilst doing this, record all signs of litter, rubbish, or waste.
3. Name each piece of rubbish in your results, and the quantity (x1, x2, etc.)

### 3.5 - Abiotic Factors

**Note: This test is done in the same space as test 3.2 - *Temperature*. Do not use a new piece of land.**

1. Within your metre square, note all signs of abiotic (non-living) factors that contribute to the functioning on an ecosystem. Some examples include: Air, dead leaves, or water.
2. Record each of these factors in your results.

## 4.0 - Results

### 4.1 - Flora and Fauna (Diagrams Enclosed.)

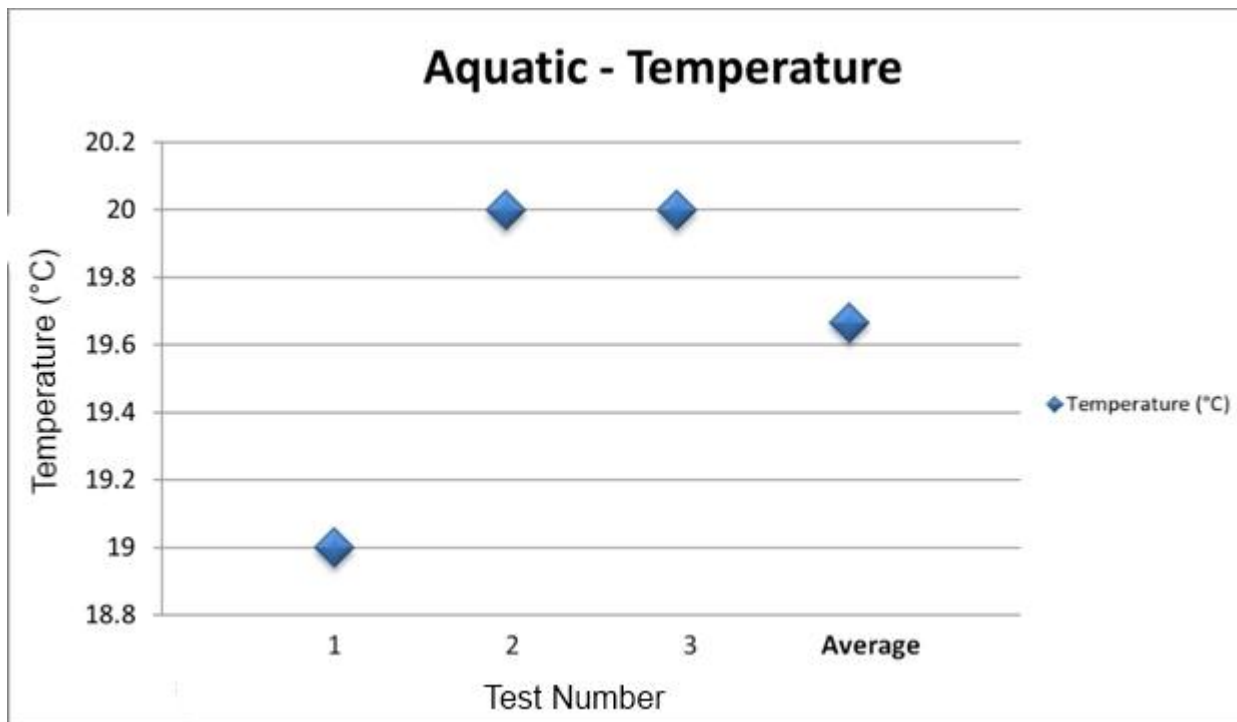
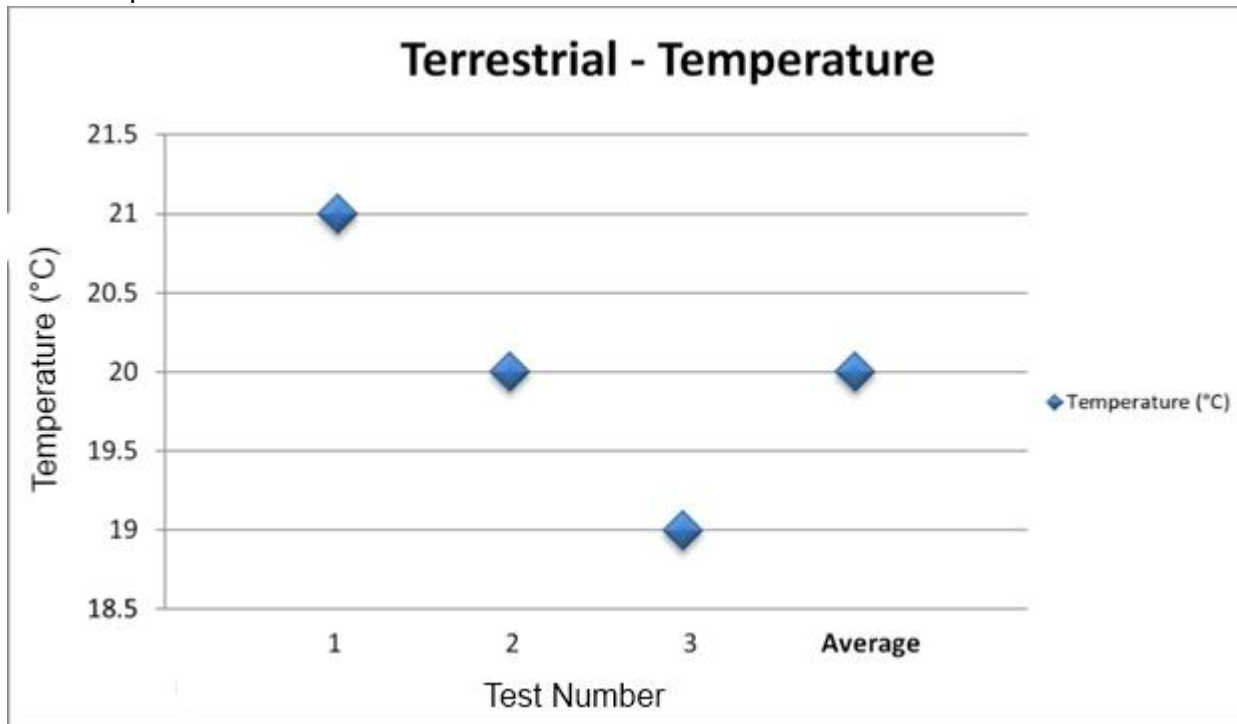
| <u>Flora</u>  | <u>Fauna</u> |
|---------------|--------------|
| Lilly Pads    | Duck         |
| Small Reeds   | Swan         |
| Clovers       | Herring      |
| Blue Grass    | Peewee       |
| Myall         | Ant          |
| Brigalow      | Flies        |
| River Red Gum | Horse        |
| Grass         |              |
| Grass II      |              |
| Poplar Box    |              |
| Buffalo Grass |              |
| Cypress Pine  |              |

**Key:**

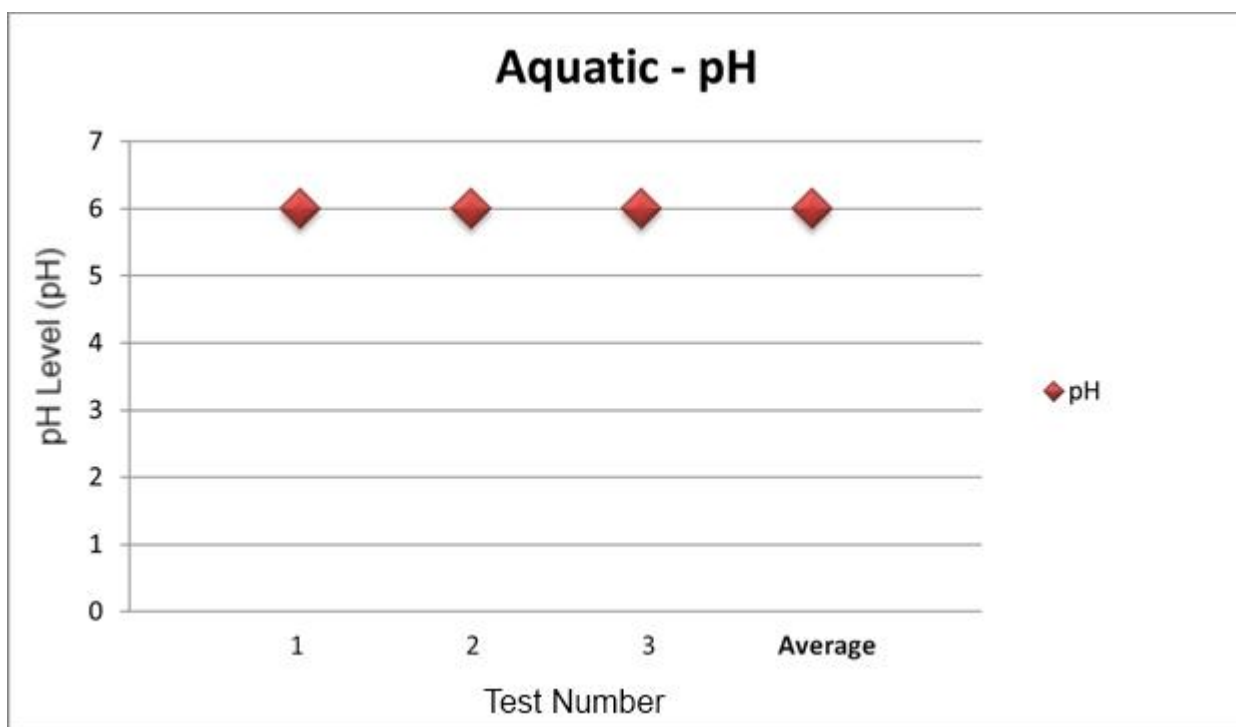
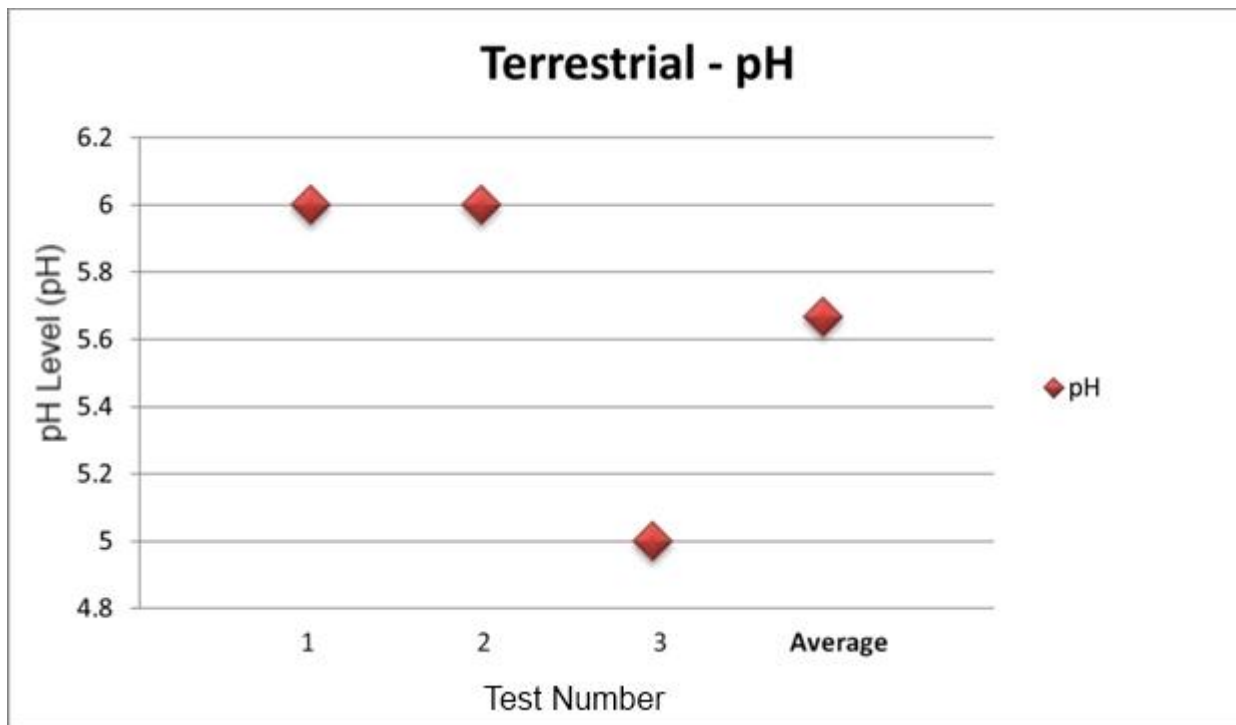
Aquatic

Terrestrial

## 4.2 - Temperature



#### 4.3 - pH



#### 4.5 - Litter

| <u>Aquatic</u> |   | <u>Terrestrial</u> |   |
|----------------|---|--------------------|---|
| Fence          | 2 | Water Bottle       | 1 |
| Trolley        | 1 | Worm Container     | 1 |
| Soft Drink Can | 2 | Coke Bottle        | 1 |
| Pipe (broken)  | 1 | Ice Coffee         | 1 |
| Wood           | 1 |                    |   |

#### 4.6 - Abiotic Factors

| <u>Aquatic</u>     | <u>Terrestrial</u> |
|--------------------|--------------------|
| <i>Water</i>       | <i>Water</i>       |
| <i>Sunlight</i>    | <i>Sunlight</i>    |
| <i>Soil/Mud</i>    | <i>Soil</i>        |
| <i>Dead sticks</i> | <i>Dead sticks</i> |
| <i>Dead leaves</i> | <i>Dead leaves</i> |
| <i>Air</i>         | <i>Dead Plants</i> |
| <i>Litter</i>      | <i>Litter</i>      |
| <i>Wind</i>        | <i>Wind</i>        |
| <i>Temperature</i> | <i>Temperature</i> |
|                    | <i>Air</i>         |
|                    | <i>Dew</i>         |

## 5.0 - Discussion

**5.1** - Within Railway Dam, there are various major abiotic and biotic factors that are responsible for how the ecosystem functions, what organisms live within it, and which ones survive and thrive and which ones do not. One example of this is the abiotic factor of sunlight. If the weather conditions of Railway Dam were very damp, overcast and heavy rain almost every day, this would mean a very small amount of sunlight would be radiated to the flora that live within that area. This would result in fewer flora, which could also result in fewer fauna, and on. This also leads to the point that flora and fauna are important - to each other and to the ecosystem as a whole. Without a certain organism, a food web's structure can be extremely different, especially fungi and plants, which are important to the first fauna on the food web - Herbivores. Within Railway Dam, many organisms have adaptive features, especially the Terrestrial Flora. The one major adaptive feature that is seen more than others is the structure of leaves within the flora of the ecosystem. Plants such as the Poplar Box, Cypress Pine, River Red Gum, Myall, and Brigalow all have physically structured their leaves so that they may absorb as much sunlight as possible; whether through the adaption of leaf structure, colour, scale or layout.

**5.2** - Within the ecosystem of Railway Dam, there is only one major piece of evidence for human destruction. This piece of evidence is the pathways and bridges which connect the various parts of the dam to each other. These two objects have been built within Railway Dam to make it easier and more convenient for visitors to navigate and explore. Without the pathways and bridges, the Dam would be used a lot less and would most likely thrive more, but would have nowhere near as many people using the dam as it does today. Out of all the people who visit and use the site, however, are merely observers or passer-

byers. This is most likely due to the fact that the Dam is possibly the best kept natural place within the Roma District, and its users and visitors want to keep it that way. The animals that inhabit the area are also very rare to find anywhere else in Roma, such as swans, herrings and ducks. Unfortunately, however, not all users of the site want to preserve it, and hence forth they: litter, walk on the grass, break branches on trees, destroy ant nests, scare away wildlife, and more. As was said earlier though, the site is kept well maintained by the council through: replanting trees, regularly checking on the site, watering various areas in time of drought, killing weeds, and through community clean-up days, and therefore as a result of this it is one of the best nature sites in the Roma District.

**5.3** - Overall, the testing of experiments was conducted successfully and fairly accurate results were collected. However, the previous night before the experiment was conducted it did rain, which caused the dam to slightly flood. This meant that the Turbidity test could no longer be conducted. Besides this minor misshapen and the fact only the flora and fauna for a small area of Railway Dam (temperature, pH, litter, abiotic) were completed exactly how they were designed to be. But, overall, this meant that the flora and fauna results were not an accurate picture of the whole site. Some possible improvements that could have possibly been made are more collection of data (meaning more accurate averages) and more accurate equipment. Besides these two factors (and the minor flooding), the experiment could not have gone better.

**5.4** - As discussed earlier, litter is a huge damaging factor to an environment and can majorly affect a particular organism. The best method of reducing the litter accumulation at the site would be possibly to either: conduct more community clean-ups, place up signs that say “if you see litter, pick it up please!” or something of that nature, or place bins around the site. Throughout the entire Railway Dam there is not one single bin, which is probably a huge cause for the litter factor. Simply placing a bin every now and then on the pathway could make a huge difference, as well as placing up signs. As discussed earlier, also, the installation of pathways has been a wise decision from a visitor’s point of view, but from an environmental point of view, overall, it has had a negative effect. The reason for this is because without a path at the area, it would be less inviting to people who are walking by, and the trees would most likely take over any place that is walkable, leaving a visitor with either the option of walking through thick, overgrown shrub, or not going to Railway Dam at all.

## **6.0 - Conclusion**

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Over the past few weeks, the elements of what make up an environment - from abiotic factors to food webs - have been looked at and studied. This knowledge was then applied to an experiment conducted at Railway Dam, a local ecosystem in Roma. Flora and fauna, temperature, pH, litter, and abiotic factors were all recorded during the experiment. The results were nothing significant and show no signs of an environment in distress, in drought or under heavy damage from humans.



## 7.0 - Bibliography

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Barwon Bluff. (Unknown, Unknown Unknown). *Abiotic Factors*. Retrieved 06 11, 7, from BarwonBluff Education:  
[http://www.barwonbluff.com.au/education/csf/..%5Cactivities%5Csurvival%5Cabiotic%20factors%20cube.p  
df](http://www.barwonbluff.com.au/education/csf/..%5Cactivities%5Csurvival%5Cabiotic%20factors%20cube.pdf)

ScienceAlert. (2008, 3 13). *Turtles and Plastic Bags*. Retrieved 6 2, 2011, from Science Alert:  
<http://www.sciencealert.com.au/news/20081403-17043-5.html>

TownsInAustralia. (08, 06 2011). *Roma, QLD*. Retrieved 06 2011, 08, from TownsInAustralia:  
<http://www.townsinaustralia.com/Roma.268.htm>

Wikipedia. (2011, 5 10). *Adaption - Wikipedia*. Retrieved 5 12, 2011, from Wikipedia:  
<http://en.wikipedia.org/wiki/Adaptation>

Wikipedia. (2011, 06 2). *Aquatic Ecosystems*. Retrieved 06 05, 2011, from Wikipedia:  
[http://en.wikipedia.org/wiki/Aquatic\\_ecosystem](http://en.wikipedia.org/wiki/Aquatic_ecosystem)

Wikipedia. (2011, 06 08). *Terrestrial Ecosystems*. Retrieved 06 08, 2011, from Wikipedia:  
[http://en.wikipedia.org/wiki/Terrestrial\\_ecosystem](http://en.wikipedia.org/wiki/Terrestrial_ecosystem)